the female flower of a Carex is represented by "a single ovary inclosed in a loose bag, which may perhaps be the final rudiment of a tubular bell-shaped corolla like that of a hyacinth"! Surely the nature of the utricle of a Carex has been clearly enough demonstrated by the structure of the flowers of monstrous specimens and of allied genera. To complete his remarks upon the sedges he adds a footnote, in which he says: "The sedges are not in all probability a real natural family, but are a group of heterogeneous degraded lilies, containing almost all those kinds in which the reduced florets are covered by a single conspicuous glume-like bract." Now there is probably hardly any large order in the vegetable kingdom so natural as that of the Cyperaceæ, so little connected with any other, and of which the genera are so closely allied together, as is proved by the comparatively small number of genera in it, and the large number of species which many of the genera contain.

The wheat plant being a degraded lily, it becomes necessary to trace the development of the flower of the one into that of the other, which is done by considering the palea of the wheat-flower as homologous with the calyx, and the lodicules as representing the corolla, a view which has long been considered untenable.

The two essays upon the distribution of plants call for some comment. Here the author is on firmer ground, for, thanks to the researches of Forbes and Watson, we have a much clearer notion of the origin of our flora than we can have of the pedigrees of the plants themselves. At the same time we must take exception to the suggestion that the seeds of the northern Holy Grass, which Robert Dick discovered in Caithness, were introduced into New Zealand from Siberia upon the feet of a belated bird. The plant in question does not occur, as far as is known, in New Zealand. The species which does occur both in New Zealand and Europe is found throughout the temperate Antarctic zone, extending even to the Cape. Nor is this distribution, as the author states, a very rare and almost unparalleled coincidence. The fact is that there is a very considerable number of plants common to the north and south temperate regions, most of which occur in North America, and seem to have descended towards the Antarctic regions along the line of the Andes.

But, apart from improbabilities in theory, there are numerous statements which cannot fail to convey erroneous impressions of plant-physiology. What, for instance, could be more misleading than the following statement concerning Potentillas? Those "which raised their leaves highest would best survive, while those which trailed or kept closely along the ground *would soon be starved out for want of carbonic acid!*" It is not the absence of carbonic acid gas that the plant would suffer from, but from the loss of light by which it could utilise it. These statements, and many others of a similar nature, suggest that Mr. Grant Allen has confined his observations too much to the flora of the British Islands. It is utterly impossible to form any correct idea of the history of the evolution of a plant without knowing thoroughly the structure of all the plants in any way related to it, and without having, moreover, a much clearer knowledge of the effects produced by external circumstances in modifying organs than we at present possess. In the meantime dogmatic statements concerning the evolution of any given plant are in the highest degree unsatisfactory, and likely to lead to error.

The book is nicely got up, and the language is in that easy and fluent style in which Mr. Allen is so proficient, and which goes so far towards investing the driest details of science with a poetical and even romantic interest.

H. N. R.

OUR BOOK SHELF

Wonders of Plant-Life. By Sophie Bledsoe Herrick. (London: W. H. Allen and Co., 1884.)

THIS is another well-intentioned but unsuccessful attempt to deal in a popular style with some of the more sensational parts of the science of botany. Inaccuracy is again the glaring fault: thus we read on p. 4 that "vegetable cells, in the earlier stages of development, generally approximate to the sphere in form"; on p. 17 that the vessels "serve to convey air through the tissues of the plant," and "are the lungs of the plant"; and again, on p. 24, that the red and ultra-red rays are those actively concerned in the process of assimilation. Similar inaccuracy may be traced in those of the illustrations which are original; for example, the drawing of Penicillium on p. 60. The frequent production of popular treatises shows that there must be some demand for such books. It is much to be desired that some botanist who is really master of his subject would take the matter up, and write in a popular style a trustworthy account of those parts of the science of botany which are of especial interest to the general public.

Histological Notes for the Use of Medical Students. By W. Horscraft Waters, M.A. (London: Smith, Elder, and Co., 1884.)

IN the introduction to this little work of 65 pages Mr. Waters states that, in taking the class of Practical Histology at the Owens College Medical School during the summer sessions of 1882-83, it had been his custom to give each student "sheets" containing a short account of the chief points to be observed in the specimens for examination. The present work has grown out of these notes, after careful revision and additions thereto by the author. Students of histology have already numerous similar treatises placed at their disposition, describing the various methods of staining, clearing, and mounting specimens; but room will always be found for additional ones bearing on this subject, provided they are the outcome of practical experience. These notes have been carefully prepared; the directions given are clear and concise, and beginners cannot do better than carefully follow them.

LETTERS TO THE EDITOR

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.*

[*The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to insure the appearance even of communications containing interesting and novel facts.*]

Pile-Dwellings on Hill-tops

I OBSERVE this question to the fore in NATURE of February 21 (p. 382), and as I have lived many years among races who build various forms of pile-houses, and have often resided in them for a time, I trust you can allow me a few words on the subject. The custom seems attributed to several causes, *i.e.* to excessive moisture and as a protection against wild beasts, by Mr. Keane; to excessive rain and a wet climate, by Col. Godwin-Austen; to damp exhalations from tropical soil, by Mr. Dallas; and to the survival of a purposeful habit of building over water, by Mr. Tylor.

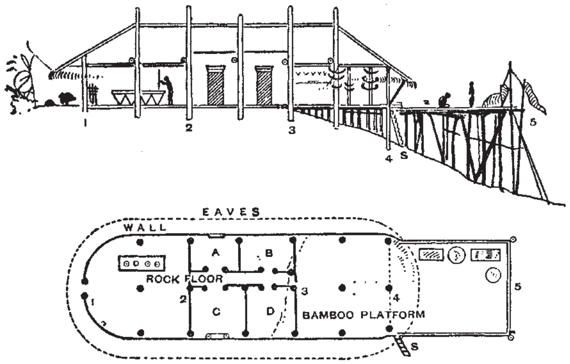
A considerable experience among Nogas, Miris, Singphus, Kamtis, Deodhains, and Duonias, who all build pile-houses a little varied in kind, convinces me that the above reasons are not strictly correct.

Possibly the Swiss lake-dwellers descended from Eastern races who built over water, and inherited a custom that perhaps subsequently proved to be beneficial to them when and where large Carnivora were common. As regards India, it seems to me there are good reasons for believing these pile-builders are the direct descendants of the pre-Aryan aboriginals, and if they brought the custom with them from the south, it must be of extreme antiquity, and have developed adaptations to local needs, as it is not here used over water.

It seems hardly due to moisture and tropical rains, as the Kasias, Augamis, and Garos, who live in the wettest climate of all, build on the ground. Again, among those who build on piles many live and sleep on the ground, using the piled part of the house for other purposes. The platforms also are generally too low to afford safety from tigers, and if so needful for health, why is the custom not more general?

Among the Miris, Singphus, Kamtis, Nogas, Mismis, and Deodhains that I have questioned as to the origin of the custom of building on piles, the answer is invariably that they do not know, that it is their tribal custom, &c. Pressed as to the advantages of it, or why they could not build on the ground like Hindus, they generally end by urging the absolute necessity of keeping things out of reach of the ever-present pig.

Section through Noga house, say 60 feet (1 to 4), E.S.E. Sibsagar.



1 to 2, Rice husking; 2 to 3, Sleeping, cooking; 3 to 4, Audience, &c.; 5, "Chang" outside; S, Steps up; A B C D, Sleeping-rooms.

Among many of these tribes, where stone for walls is not easily procurable, the jums even have to be at some distance *for the same reason.*

As an illustration of how this animal practically affects the question of house-building, I append a section of a typical average Noga house, as built by the tribes south-east of Sibsagar to the Upper Dihing. One end generally rests on the ground, while the other overhangs a slope for which there often seems to be no occasion, as plenty of level land is about. In all houses of this type the end devoted to husking rice rests on the ground, and the door at that end has a slab that can be raised to admit pigs to eat the husks. This compartment (one-third of the house) is divided from the living and sleeping part by a wall and a door with a stile to keep out pigs. There are generally from two to six, or more, sleeping-rooms on the ground, and beyond them again is an open room used for visitors, or to sit and work in during wet weather. It is hung round with horns and trophies, contains hunting and fishing gear, arms and utensils, and small stores. It is the recognised audience-hall, and built on piles; the floor of it is generally carried out beyond the eaves of the roof, often supported on long bamboos (where the slope is steep), and this outer part or raised floor is seen in some shape or other in all these houses. It is used to sit out on in fine weather, to work on; rice, yams, sliced vegetables, fruit, fish, flesh, &c., are put there to dry; pottery is made, and things laid while they are gone to the jums, safe from the prowling pig. From one end of the house to the other, indeed, these prolific scavengers are apparent as an institution.

As a rule these pile-houses run from thirty to two hundred feet long, and are wholly on piles if in the level plains, but the several tribes have slight modifications. They are still built by the Deodhains, a remnant of the Shans who came into Assam in 1228, and gave it their name (from Ahom); about five hundred of these people still remain in some six or eight villages not far off, though dying out. Their language and written character possibly is a unique case of a written language not yet secured. While they remain Ahoms they keep and eat the pig and build on piles, but when converted to Hinduism the pig and piles are given up together.

I am aware that pigs are kept by Kasias and Garos, &c., who yet do not build on piles, but stone for walls and slabs of gneiss are there *alone* common, and are effectually used as inclosures or as barriers. There is practically no building-stone where we see the piles in use; and also bamboo is there common.

But there are many other things besides pile-dwellings that prove these now distinct tribes to have descended from a common stock. The "morongs," or houses in which the lads and single men sleep at night, away from their parents' houses, are seen under various names all through these hills, north, south, and east of Assam, a custom that has survived the differentiation of the languages. There are also "morongs" for the girls and single young women, and there are special and peculiar laws relating to morongs.

Liberty of the sexes before marriage is indeed practically so complete among all these tribes that really *morals begin with marriage.* After marriage they are better, I think, than civilised nations.

These customs and pile-buildings, &c., indicate a common origin, but there are also means by which we can ascertain the common *home* more or less accurately, and which show that these pile-builders are descended from the pre-Aryans of the plains, from Assam to the Indus, who named so many of the rivers. In and around Assam we find these names often begin and end with Di and Ti—as Dihing, Dihong, Dibong, Dibru, Dima, Dipha; Timu, Tiok, Tisa, Tiru, Tiwa, Tista, or Aiti, Galti, Seti, Tapti, Rapti, Kamti, Gulmthi, Ningthi, Lathi, &c. This Di, Ti, means in all cases "water,"—as Ti, water; Sa, the little, young = Tisa, the "young river"; and there are other forms—as Lushai Tui, Kachari Doi, Noga Ti, Tsi, Tzu; Chu is also Thibetan, Bhotan, and Chinee; Mongolian being Su, Ussu.

But the Himalaya has acted as a conspicuous speech-parting. South of it we have the pile-builders' form—Di, Ti, Doi, Da, Dzu; and north of it, from the east of China, all across Central Asia, Persia, and Asia Minor, to the Gulf of Salonica even, we have the northern Chu and Su in some form. Of Kara Su = black water, and Ak Su = white water (our Oxus) there are scores of instances; even the "Ind-us" and Eu-phrat-es, and many others, fall into the group.[1]

I drew up lists of these river-names some years ago in the *Journal A. S. Bengal*, vol. xlviii. part 1, 1879, pp. 258–70.

Thus it would seem as though the races who now build these pile-houses, often on hill-tops, are the descendants of those who named so many of the Indian rivers south of the Himalaya, *i.e.* the pre-Aryan inhabitants.

Whether these races originally came from the south or not we cannot yet be certain. But there are several customs, such as "head-hunting" and "pile-dwelling," held in common with races of the Archipelago; and among the most eastern Nogas the dress is as nearly as possible *identical* with that of the Dyaks, as illustrated in Dr. E. B. Tylor's "Anthropology," so that eventually it may be possible to say.

In conclusion, I might mention that the word "Naga," as applied to the tribes south and south-east of Assam, is an Anglo-Bengali-ism, and misleading. It should be Noga, which is the name by which these tribes are known in Assam. It is not a racial name in the hills at all, and has originated from the Noga word "Nok" for folk.

Thus, Who are you? is "tem nok?" or "o nok e?" N and L are interchangeable letters, and thus Dr. Rajendralala, Mitr, pointed out to me that the Noga Nok and the Sanskrit Lok = man, seem the same word. We use the word Log = folk (logue) almost hourly in Assamese, Bengali, and Hindi, and philologists may perhaps be able to say if we get our word folk from this same root, and for which it is the exact equivalent. But the word for these hill-men is "Noga," and they do *not* worship snakes. The real Nagas are in another part of

---

[1] The Assyrian hu, Greek eu, Scythian ku = water (A. Cunningham "Anct. Geo.," p. 37).

India, and I trust Dr. Hunter and Mr. Phil Robinson will excuse my saying they are both wrong *re* this name.

These hill-men have histories, if we could only get at them. This I find by having traced forty-six villages (now nine or ten different clans) as being offshoots of "Sang-nu," east-south-east of Sibsagar. Twenty-five generations ago they began to spread.

S. E. Peal

Sibsagar, Assam, May 5

Atmospheric Dust

On Thursday, April 24, showers of discoloured rain fell at Inglewood, Sandhurst, Castlemaine, Kyneton, Daylesford, and the districts adjacent, that is to say, over an area of more than 2,500 square miles in extent. The heaviest showers—called by all who were out in them "showers of mud"—occurred at 7 o'clock p.m. and near midnight. The leaves of trees and shrubs, roofs of buildings, fences, and everything on which it could rest were more or less covered with red mud. The weather at Sandhurst for some ten days prior to this occurrence had been dry, and for a long period there had been a drought in New South Wales and in many parts northward. At several places in Victoria and New South Wales violent dust-storms occurred on the morning of the 24th immediately preceding the commencement of the rain. Some of the mud, of a bronze colour, collected by Mr. Edward Hurst of Sandhurst, was found by microscopical and chemical examination to be composed of quartz, oxide of iron, and mica; some taken from the rain-gauge stand at the School of Mines was, when dried, an almost impalpable powder of a pale reddish chocolate colour. It was seen to consist of ferruginous quartz and minute particles of black oxide of iron; and a smaller quantity collected at my private meteorological observatory—about three-quarters of a mile distant—was paler in colour, and consisted of quartz (much of it iron-free), alumina, sesquioxide of iron, and white and reddish-yellow mica. A small proportion of it was attractable by the magnet. The water collected in the rain-gauges when agitated was reddish-brown in colour, and the proportion of sediment was very large, leaving no room for doubt that the dust was brought down by the rain. Its composition and the times at which it fell lead me to believe that it came from the north and had travelled far.

R. Brough Smyth

School of Mines, Sandhurst, Victoria, Australia,
May 1

The "Red Glow" after Sunset

Being out on Sandymount Strand last night, whence the western sky may be well observed, I noticed, about 8.45 p.m., the "red glow" over the yellowish sky where the sun had set. It was quite as distinct as during certain evenings at the end of last year.

J. P. O'Reilly

Royal College of Science for Ireland, Stephen's Green,
Dublin, June 12

The Earthquake

As communications on this subject are still being received by Nature, and as the records for London and its immediate vicinity have been few, it occurs to me to note the following facts:—At the time of the earthquake I was sitting in my study here. There are several heavy insect-cabinets in the room, and a loud "groan" proceeded from one or more of them, indicating "settling" from some cause or other. Furthermore, the door of the room would not lock on the evening of that day, although the lock had moved freely down to then. And a clock in a bed-room was found to have stopped without any apparent cause at the hour indicated for the earthquake; but as the discovery was not made until late in the evening, it was not possible to decide whether the stoppage had occurred in the morning or evening. As no sensation was *felt*, these matters would have held no significance had it not been for the news in the evening papers of that day.

R. McLachlan

Clarendon Road, Lewisham, S.E., June 13

Intelligence in Animals

There is at Walham Green a daily illustration of intelligence in a donkey which may interest those of your readers who collect such facts. Old Bob the waterman has been known for so many years that it is impossible to say how many. He is one of the few surviving carriers who take round for sale water in a tub on wheels, which is drawn by a donkey. Bob, the tub, and the donkey are one of the institutions of Walham Green. Years ago Bob used to guide his donkey to the pump near the church and then drive him round to his customers. How long the donkey was learning his rounds I do not know. Three years ago Bob used one shaft as a sort of movable crutch, and seemed to trust much to his donkey to go the right way. Now he appears quite blind, for a few days ago he was noticed going into the yard where the pump stands, when the donkey stopped. He asked a boy what his donkey had stopped for, and was told that a cart was in the way. It is interesting to note that the donkey conducts by his own intelligence all the business of water distributor, while Bob has sunk to the condition of mere pumper and of money collector attached to and led by the shafts, which latter duty might be done by an intelligent dog.

M.

ADOLPHE WURTZ AND HIS CHEMICAL WORK

By the death of Adolphe Wurtz on May 12 last, the world, and especially the scientific world, has lost one of its brightest and most energetic leaders,—a successful leader indeed, through perhaps the most difficult period of chemical history—the earliest years of the development of our "modern chemistry." His loss is felt all the more acutely, coming as it does so suddenly and so close upon that of his master and friend, Dumas, whose mantle had fallen upon him.

Charles Adolphe Wurtz was the son of a Protestant clergyman, and was born on November 26, 1817, at Wolfsheim, near Strasburg. He studied in the University of Strasburg in the Medical Faculty, in which he took the Doctor's degree with honours in 1843. He came to Paris in 1844, where he soon attracted the attention of Dumas, and after occupying several positions successively at the École Centrale and the Faculty of Medicine he became Professor at the Institute Agronomique of Versailles, and in 1853 succeeded to the duties of Dumas and Orfila as Professor at the Faculté de Médecine.

Wurtz united in himself all the better qualities of the Gallic and Teutonic character, in his activity of mind and untiring perseverance in the search for truth. He was elected a member of the Academy of Medicine in 1856, and in 1865 was awarded the prize of 20,000 francs for his chemical researches. He became Dean of the Faculty in 1866, and Professor at the Sorbonne in 1878, in which year also he gave the Faraday Lecture at the Royal Institution; the subject of which was the condensation of gases, and his hearers on that occasion will not readily lose the impression of his earnestness and vivacity, especially on the appearance of the liquefied gas (ammonia), and his exclamation, "Voilà! voilà le liquide," &c.

His earnestness of purpose, conjoined with a most genial manner and expression, gave him very great influence over those students who worked with him; and a long list of names might be given of students who have done good service to the science under his guidance and encouragement.

But he not only encouraged the students who came to learn under him, but strove to spread a knowledge of science amongst the mass of the public, in which task he was eminently successful.

In addition to his onerous duties as professor, Wurtz was in 1881 elected permanent Senator, and rendered most valuable services to his country as recorded in his Reports of Commissions on the trichinosis outbreak and on scientific education.

While there are chemists the work and example of Adolphe Wurtz will serve as a beacon and guiding light to still wider and more important facts in our science.

The Royal Society's Catalogue of Scientific Papers contains a list of no fewer than one hundred and four papers to which the name "Adolphe Wurtz" is alone